MULTIMEDIA UNIVERSITY

STUDENT ID NO

SEAT NO

VENUE: _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PMT0201 – MATHEMATICS II

(All sections/ Groups)

27 FEBRUARY 2017
2.30 p.m. – 4.30 p.m.
(2 Hours)

Question	Marks
1	/10
2	/10
3	/10
4	/10
5	/10
Total	/50

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **ELEVEN** printed pages excluding cover page.
2. Answer **ALL** FIVE questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the **QUESTION BOOKLET**. All necessary working steps **MUST** be shown.

Question 1

a) Let $P\left(\frac{2}{3}, y\right)$ be a point on the unit circle. If P is in Quadrant IV, find the value of y.

(2 marks)

b) Find the exact value of $\tan\left(\sin^{-1}\left(-\frac{5}{7}\right)\right)$. Simplify your answer. (3 marks)

c) Given that $f(x)=-\frac{3}{2}\cos\left(x+\frac{\pi}{2}\right)+1$.

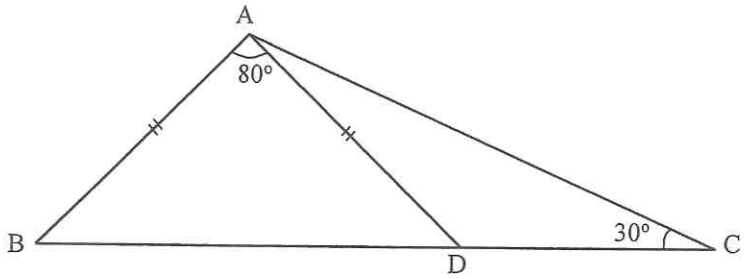
i) Determine the amplitude, period, phase shift and vertical shift of $f(x)$. (2 marks)

ii) Graph one complete period of $g(x)=-\frac{3}{2}\cos x$. On the same axes, sketch one complete period of the function $f(x)$. Indicate clearly the y-intercept of the graph for $f(x)$. (3 marks)

Continued…

Question 2

a)



If the area of the isosceles triangle ABD above is $10\ cm^2$, find the

i) length of AD. Round your answers to FOUR decimal places. (1.5 marks)

ii) length of AC. Round your answers to FOUR decimal places. (1.5 marks)

Continued…

b) Solve $2\tan y \sin 2y + \cos 2y - \frac{3}{2} = 0$ for $0° \leq y \leq 360°$. (3 marks)

Continued…

c) Suppose $w = \frac{1}{2} + \frac{\sqrt{3}}{2}i$.

i) Find the polar form of w. (2 marks)

ii) Use De Moivre's Theorem to find w^5. Leave the answer in the form of $a + bi$ where $a, b \in \Re$. Express a and b in exact value. (2 marks)

Continued…

Question 3

a) Compute the limits. Show at least one intermediate step.

i) $\lim_{x\to\infty} \frac{10x^4+3x^2-x+1}{5x-x^3-3x^4}$ (2 marks)

ii) $\lim_{x\to 0} \frac{\sin 5x}{8x}$ (2 marks)

b) Consider $f(x)=\dfrac{2x}{x+5}$.

i) Evaluate $\lim\limits_{x\to -5^-}\dfrac{2x}{x+5}$. (1.5 marks)

ii) State the vertical asymptote, if any. (0.5 mark)

c) Given the function $f(x)=\begin{cases}3x+4k & \text{if } x=0\\ \dfrac{6x}{\sqrt{x+16}-4} & \text{if } x\neq 0\end{cases}$ is continuous at $x=0$, find the value of k. (4 marks)

Continued…

Question 4

a) Consider the function $f(x)=\sqrt{x+1}$. Find $f'(x)$ using the formal definition of derivative. (3 marks)

b) Find the $\frac{dy}{dx}$ if $y=\sin^2(5x^3)$. Show proper steps. (3 marks)

Continued…

c) A rock is thrown vertically upward with an initial velocity of $25m/\text{sec}$ and its height after t seconds is $s(t)=\frac{1}{3}t^3-5t^2+25t$.

i) How long does it take the rock to reach its highest point? (1.5 marks)

ii) What is the maximum height reached by the rock? (1 mark)

iii) What is the acceleration of the rock when $t=7s$? (1.5 marks)

Question 5

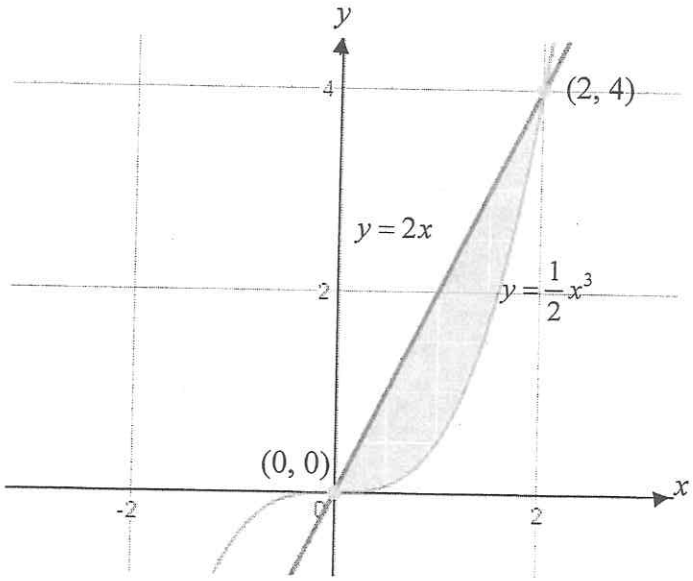
a) Find the definite integral $\int_0^2 \frac{3x^2+5}{\left(x^3+5x+1\right)^2}\,dx$ using integration by substitution.

(3 marks)

b) Find the indefinite integral $\int x\cos(2x)dx$ using integration by parts. (4 marks)

Continued…

c) Consider below the graphs of $y = \frac{1}{2}x^3$ and $y = 2x$. Find the area of the shaded region by integrating with respect to the x-axis.



(3 marks)

End of Page